

REMARKS

This paper is being presented in response to the final official action dated August 12, 2008, wherein: (a) claims 1, 2, and 5-52 are pending; (b) claims 17-39 and 50-52 have been withdrawn from further consideration in view of the restriction requirement imposed in the March 3, 2006, official action; and, (c) all of the examined, pending claims (i.e., claims 1, 2, 5-16, and 40-49) have been rejected under 35 USC § 103(a) as being obvious over the "combined teachings of AAPA (Applicants' Admitted Prior Art) and DE 1643724 and optionally DE 1619940 (Both Cited by Applicant)." The Action at p. 3. Reconsideration and withdrawal of the rejection are respectfully requested in view of the foregoing amendments and following remarks.

This paper also is being presented in accordance with 37 CFR § 1.116(e) in an effort to place the application in condition for allowance. The arguments presented herein were not (and could not have been) presented in prior communications to the U.S. Patent and Trademark Office (Patent Office) due to the applicants' good faith belief that all prior rejections had been overcome by amendment and/or argument. Indeed, *all* prior rejections were overcome by amendment and argument. The current action, however, applies new publications to support the new § 103(a) rejection of the pending claims. This paper responds to that new rejection.

I. Summary of the Amendments to the Claims

Independent claim 1 has been amended to more clearly define the filtration zone as defining higher and lower concentration zones that are separated from one another by a filter. Written description support for this amendment can be found in the drawing figures and the specification text describing those figures. Claim 1 also has been amended to more clearly specify that the displacement fluid is insoluble in the slurry feed components. Written description support for this amendment can be found in the specification at, for example, page 8, lines 12-16, which states that the displacement fluid preferably is "insoluble in one or more solids of the slurry feed" and "insoluble in one or more liquids of the slurry feed." Claim 1 has been further amended to more clearly recite that the displacement fluid displaces at least a portion of the liquid from the slurry feed "past the filter and into the lower concentration zone to produce a filtrate in the lower concentration zone." Written description support for this amendment can be found in the claim as originally filed.

Dependent claims 5 and 6 have been amended to more clearly recite that a portion of the displacement fluid (or gas) flows from the higher concentration zone through the filter and into the lower concentration zone. Written description support for this amendment can be found in the drawing figures and the specification text describing those figures.

Dependent claims 42, 43, 46, and 47 have been canceled herein without prejudice, and the recitations therein have been incorporated into independent claim 40.

Independent claim 40 has been amended to combine previously recited steps (a) and (b) into a single step. Claim 40 also has been amended to more clearly specify that the displacement fluid is insoluble in the slurry feed components. Written description support for this amendment can be found in the specification at, for example, page 8, lines 12-16, which states that the displacement fluid preferably is "insoluble in one or more solids of the slurry feed" and "insoluble in one or more liquids of the slurry feed." Claim 40 has been further amended to more clearly recite that "substantial portions of the displacement fluid and liquid in the slurry feed flow through the filter to form a filtrate inside of the at least one filter tube and a dense phase outside of the at least one filter tube." Written description support for this amendment can be found in the specification at, for example, page 14, lines 2-11, page 15, line 23 to page 16, line 4, in original and now-canceled claims 42, 43, 46, and 47, and in the drawing figures. Still further, claim 40 has been amended to specify that the displacement fluid is directed into the hollow cylinder "countercurrent to the flow of the slurry feed." Written description support for this amendment can be found in the drawing figures and the specification text describing the same, and also in canceled claim 3, for example.

The foregoing claim amendments *do not* introduce new matter into the application or into the claims. Importantly, the claim amendments *do not* necessitate a new search and, therefore, any further action rejecting the claims on newly cited prior art may not be made final. See MPEP § 706.07(a) (8th ed., Rev. 6, Sept. 2007) (stating that a "second or any subsequent action on the merits in any application ... should not be made final if it includes a rejection, on prior art not of record, of any claim amended to include limitations which should reasonably have been expected to be claimed").

II. The 35 USC § 103(a) Rejection

All of the examined, pending claims (i.e., claims 1, 2, 5-16, and 40-49) have been rejected under 35 USC § 103(a) as being obvious over the "combined teachings of AAPA (Applicants' Admitted Prior Art) and DE 1643724 and optionally DE 1619940 (Both Cited by Applicant)." The Action at p. 3. The applicants respectfully submit that the subject matter recited in these claims (as amended herein) is not obvious over the combined disclosures of the applied prior art. The rejection is therefore traversed.

A. Proper Basis for a § 103(a) Rejection

The patent statute states:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a

whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 USC § 103(a). A determination that a claimed invention is obvious under § 103(a) is a legal conclusion involving four factual inquiries: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any, of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). Obviousness is determined from the vantage point of a hypothetical person having ordinary skill in the art to which the claimed subject matter pertains, who is presumed to have all prior art references in the field of the invention available to him/her. *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998). Furthermore, obviousness must be determined as of the time the invention was made and in view of the state of the art that existed at that time. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050-51 (Fed. Cir. 1988).

B. The § 103(a) Rejection Is Traversed Because the Action Fails to Demonstrate the Claimed Subject Matter is Prima Facie Obvious

The Patent Office "has the burden under § 103 to establish a prima facie case of obviousness." *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988); MPEP § 2142 (8th Ed., Rev. 6, Sept. 2007) ("The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness."). The Supreme Court recently identified a number of rationales that may be used to support a conclusion of obviousness, consistent with the framework set forth in its decision in *Graham v. John Deere Co.* See *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739-40 (2007). These and other representative rationales are described at MPEP § 2143 (8th Ed., Rev. 6, Sept. 2007). Regardless of the supporting rationale, however, the Patent Office must clearly articulate facts and reasons why the claimed invention "as a whole" would have been obvious to a hypothetical person having ordinary skill in the art at least as of the claimed invention's effective filing date. See *KSR Int'l*, 127 S.Ct. at 1741 (citing with approval *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.")); see also MPEP § 2143 ("The key to supporting any rejection under 35 USC § 103 is the clear articulation of reason(s) why the claimed invention would have been obvious.").

First, the action does not clearly articulate facts and reasons why the claimed invention as a whole would have been obvious to a hypothetical person having ordinary skill in the art. Specifically, the action does not articulate findings of fact relating to the scope and content of the prior art and the differences between the claimed invention and the prior art, in contravention of *Graham*, 383 U.S. at 17-18. Second, the action identifies no objective

rationale to support its conclusion of obviousness, in contravention of *KSR*, 127 S.Ct. at 1741. Third, regardless of what objective rationale might possibly underlie the action's conclusion, the action fails to articulate facts sufficient to support any such rationale. For each of these three independent reasons, the action does not demonstrate that the claimed subject matter is *prima facie* obvious. Accordingly, the applicants respectfully traverse the rejection, and request reconsideration and withdrawal of the rejection.

U.S. Patent No. 3,804,915 (to Schmid et al.) is an English-language equivalent to the German-language patent publication No. DE 16 43 724, which the action applies to reject the examined, pending claims under § 103(a). U.S. Patent No. 3,469,369 (to Helmke) is an English-language equivalent to the German-language patent publication No. DE 16 19 940, which the action optionally applies to reject the examined, pending claims under § 103(a). Copies of the '915 and '369 patents are attached hereto as Appendices "A" and "B," respectively. For the sake of further conveniences, this response will refer to the (English-language) text in those patents.

The action quotes a passage from each of DE 16 43 724 and the present application, and submits that "in view of the teachings of DE 16 43 724, it would have been obvious to employ an inert medium to displace mother liquor from crystals in any conventionally known separation devices." The action's submission presumes that prior art *other than* DE 16 43 724 describes every single aspect of the applicants' claimed invention except that it does not disclose an inert medium as a displacement fluid. That presumption is necessary to support the action's submission. There is, however, no evidence supporting that presumption. And because that presumption is not supported by any evidence, the action's rejection and conclusion of obviousness is erroneous.

Independent claim 1 recites a process for separating solids from liquids in a filtration zone defining higher and lower concentration zones that are separated from one another by a filter. The process includes flowing a slurry feed into the higher concentration zone, and flowing a displacement fluid into the higher concentration zone countercurrent to the flow of the slurry feed. The slurry feed includes a liquid and a solid. The process also includes removing at least a portion of the liquid through the filter to the lower concentration zone. The displacement fluid is insoluble in the slurry feed components and displaces at least a portion of the liquid from the slurry feed past the filter and into the lower concentration zone to produce a filtrate in the lower concentration zone. See *generally*, claim 1.

Independent claim 40 also recites a process for separating solids from liquids. The process includes flowing a slurry feed into a hollow cylinder of a filter column. The process also includes flowing a displacement fluid insoluble in components of the slurry feed into the hollow cylinder countercurrent to the flow of the slurry feed. The filter column includes the

hollow cylinder and at least one filter tube that is disposed and extends in an axial direction within the cylinder. The tube(s) includes an integrally attached filter that forms a direct connection between respective interiors of the tube(s) and the cylinder. In the process, substantial portions of the displacement fluid and liquid in the slurry feed flow through the filter to form a filtrate in the interior of the tube(s) and a dense phase outside of the tube(s). See *generally*, claim 40.

In contravention of the burden the Patent Office must bear, the action identifies no disclosure in either DE 16 43 724 or the applicants' allegedly admitted prior art of the features recited in independent claim 1. Instead, the action quotes a portion of a machine-generated, English-language translation of DE 16 43 724. A presumably more reliable and accurate translation, however, is present in the '915 patent:

Although it was previously assumed that higher purities required initial removal of mother liquor adhering to p-xylene crystals and recrystallization of resulting crystals, such is not in accord with the present invention wherein purities of more than 99.5% by weight can be realized if, in a known manner, p-xylene is crystallized out of a C₈ aromatic mixture, which may contain impurities of other hydrocarbons, e.g. portions of C₉, at low temperatures and the mother liquor is subsequently separated, e.g. in a filter, and the filter cake is purified in such a manner that an inert medium, which carries with it the mother liquor adhering to p-xylene crystals from the filter cake, is passed through the filter cake.

The '915 patent at col. 1, lines 66, to col. 2, line 7. Based on this, a person having ordinary skill in the art is taught to crystallize p-xylene out of a C₈ aromatic mixture "in a known manner ... at low temperatures." The skilled artisan is informed that this C₈ aromatic mixture may contain impurities of other hydrocarbons, "e.g. portions of C₉." Next, the skilled artisan is taught to separate the mother liquor from the crystal p-xylene with, for example, "a filter" to produce a filter cake of the crystals. In the only two examples described in DE 16 43 724, the obtained filter cake is "regularly compressed and flattened." See *id.* at col. 3, lines 36-37. Thereafter, the skilled artisan is taught that any mother liquor (and impurities therein) adhering to the p-xylene crystals in the filter cake can be removed from the crystals by passing an inert medium through the filter cake. In view of these teachings, it is clear that DE 16 43 724 requires two steps to obtain a purified p-xylene: (a) filtration to separate liquid from the solid crystals, and (b) passing an inert medium through the filter cake to dislodge any liquid that may adhere to the solid crystals.

The action presumes that "conventionally known separation devices" described in the "Background of the Invention" portion of the present application can be modified to accommodate use of the inert medium disclosed in DE 16 43 724. The action, however, identifies no particular device. Indeed, based on a review of the "Background," no device described therein can be modified to accommodate use of the inert medium disclosed in DE 16 43 724 to arrive at the claimed invention. And contrary to the action's presumption, the

novelty of the claimed invention does not lie exclusively in the applicants' finding that feeding a displacement fluid instead of a wash liquid produces a relatively dry and pure product with sufficient solids content.

The action does not identify where in the applied prior art there is a disclosure of a process that includes flowing a slurry feed into the higher concentration zone, and flowing a displacement fluid into the higher concentration zone, countercurrent to the flow of the slurry feed, as recited in independent claims 1 and 40. Neither DE 16 43 724 nor anything in the "Background" portion of the present application discloses as much. The "Background" portion of the application describes two U.S. patents to Thijssen. Those patents disclose a process that includes a washing zone that can form a unit with the apparatus shown in Figure 2 of U.S. Patent No. 4,734,102, and be mounted between filters 3 of the apparatus and means employed to remove a concentrated suspension from the apparatus—those means include a rotatable knife 14, pins 24 and 25, a shaft 23 to rotate pins 24, and associated mechanisms 22 and 20 to rotate the knife 4 and drive the shaft 23, respectively:

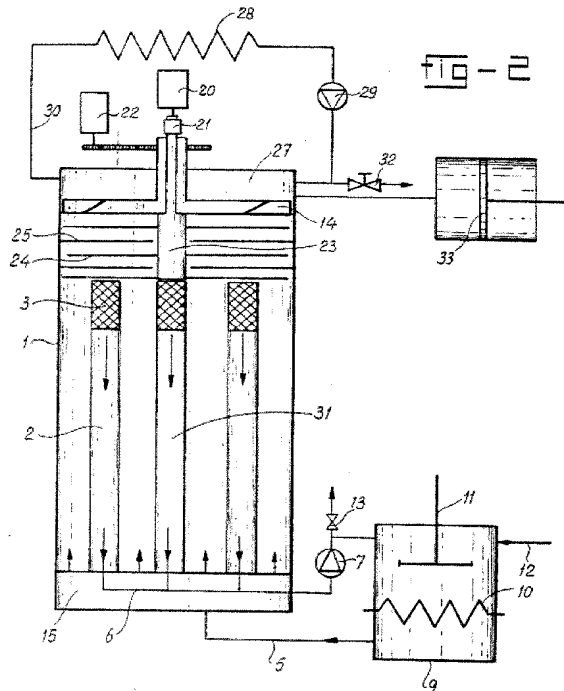


Figure 2 of U.S. Patent No. 4,734,102.

See the '102 patent at col. 7 (describing Figure 2). Formed and mounted according to these teachings, the washing zone and washing fluid do not filter or separate the solids from the mother liquor of a slurry feed. To the contrary, that filtration and separation occurs upstream of the washing zone and occurs without the assistance of any washing liquid. To be sure, the

'102 patent teaches that the concentrated suspension—not the slurry feed—is treated in a washing zone:

The suspension concentrated in the apparatus according to the invention, which suspension has been treated in this apparatus with a liquid in concurrent *can then be treated* in a washing zone in countercurrent with another liquid.

Id. at col. 3, lines 36-40 (emphasis supplied). The foregoing teaches the ordinarily skilled artisan that filtration/separation has already taken place to provide a *concentrated* suspension that "can then be treated"

As the applicants indicated in the present application, the process described in the Thijssen patents introduces a wash liquid into an end of the filtration apparatus opposite the end where the slurry feed enters. The wash liquid is introduced to *reslurry* the concentrated suspension. See ¶ [0008] of the applicants' pre-grant publication. The applicants respectfully submit that there is nothing in these patents (or any other disclosure in the "Background" portion of the present application) suggesting that the wash liquid displaces the mother liquor of a slurry feed or otherwise causes the mother liquor to pass through the filters 3 and out of the apparatus to leave behind a concentrated solid product. Moreover, there is no evidence that the ordinarily skilled artisan would reasonably expect success in simply replacing the wash liquid in the process of the Thijssen patents with the inert medium disclosed in DE 16 43 724.

As mentioned above, U.S. Patent No. 3,469,369 (to Helmke) is an English-language equivalent to the German-language publication (i.e., DE 16 19 940 B), and for the sake of further conveniences, remarks herein regarding the German-language publication will refer to the (English-language) text in the '369 patent. It is unclear what aspect of the '369 patent supports the obviousness rejection. The '369 patent merely describes a process for pressurized filtering and out-gassing fluids. The '369 patent describes and illustrates an apparatus (see Fig. 2) containing a pressure chamber 3 and a vacuum chamber 4 separated by a filter assembly. According to the '369 patent, fluid is introduced into the pressure chamber 3 under relatively little pressure. Air present in the filter assembly 19 is evacuated. Once a suitable vacuum level is attained, the pressure in the pressure chamber 3 is increased to force fluid through the filter assembly 19 and into the vacuum chamber 4. The pending claims recite features nowhere disclosed or otherwise suggested in the '369 patent. Specifically, the pending claims recite "flowing a displacement fluid ... countercurrent to the flow of the slurry fluid," which is not disclosed or otherwise suggested in the '369 patent.

The entirety of the § 103(a) rejection spans two pages in the action, one page of which is simply a reproduction of a drawing figure from one of the applied prior art references (DE 16 19 940 B). Based on that limited discussion, it is unclear to the applicants what

rationale the action asserts as a basis for rejecting the claims under § 103. See MPEP § 2143.

To the extent that the action is supporting the § 103(a) rejection by the rationale that the substitution of one known element for another would have yielded predictable results to the ordinarily skilled artisan, the applicants respectfully disagree. The action does not articulate any findings that the prior art actually discloses a method that differs from the claimed method by the mere substitution of some step or element with another step or element. Specifically, and as detailed above, the action does not set forth any facts demonstrating that prior art *other than* DE 16 43 724 describes every single aspect of the applicants' claimed invention except that it does not disclose an inert medium as a displacement fluid. This rationale supporting the § 103 rejection does not apply, however, absent such findings. See MPEP § 2143 (B).

The action does not articulate any findings that the substituted components were known in the art *and* that their functions were known in the art. Specifically, the action does not set forth that a displacement fluid can be used instead of a wash liquid to separate a mother liquor from solid components present in a slurry. The action's position to the contrary notwithstanding, DE 16 43 724 does not describe as much. As demonstrated above, DE 16 43 724 requires two steps to obtain a purified p-xylene: (a) filtration to separate liquid from the solid crystals, and (b) passing an inert medium through the filter cake to dislodge any liquid that may adhere to the solid crystals. The applicants have, however, found that a single step can be employed to accomplish as much. The asserted rationale supporting the § 103 rejection does not apply, however, absent findings that the substituted components (an inert medium) were known in the art *and* that their functions (as a fluid suitable to displace the mother liquor of a slurry) were known in the art. See MPEP § 2143 (B).

To the extent that the action is supporting the § 103(a) rejection by the rationale that the skilled artisan would have been motivated to combine the prior art to achieve the claimed invention *and* that there would have been a reasonable expectation of success, the applicants respectfully disagree. The action does not articulate any findings that there was some teaching, suggestion, or motivation, either in the applied prior art or in the knowledge generally available to one of ordinary skill in the art, to combine teachings present in the applied prior art. Specifically, the action does not set forth any findings that the applied prior art contains a disclosure of a process that includes flowing a slurry feed into the higher concentration zone, and flowing a displacement fluid into the higher concentration zone countercurrent to the flow of the slurry feed, as recited in independent claim 1. Neither DE 16 43 724 nor anything in the "Background" portion of the present application discloses as much. This rationale supporting the § 103 rejection does not apply, however, absent such

findings. See MPEP § 2143 (G). Even if the applied prior art contained such a disclosure, the mere fact that the applied prior art can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to the ordinarily skilled artisan. See *KSR Int'l*, 127 S.Ct. at 1740. The action articulates no facts demonstrating such predictability or a reasonable expectation of success. This rationale supporting the § 103 rejection does not apply, however, absent such findings. See MPEP § 2143 (G).

C. Conclusion

In view of the foregoing, the applicants respectfully traverse the § 103(a) rejection and submit that the claimed invention is unobvious. The applicants, therefore, request reconsideration and withdrawal of the rejection.

Prima facie obviousness under § 103 is a legal conclusion—not a fact—based on underlying facts. *In re Rinehart*, 531 F.2d 1048, 1052 (CCPA 1976); *In re Kumar*, 418 F.3d 1361, 1365 (Fed. Cir. 2005) ("Determination of obviousness under 35 USC § 103 is a legal conclusion based on underlying facts."). The foregoing response identifies facts (e.g., evidence in the form of statements in the prior art) rebutting the alleged legal conclusion that the claimed invention is prima facie obvious. All of these facts must be evaluated along with the facts on which the legal conclusion was originally reached—not the legal conclusion itself. Having requested herein reconsideration of the legal conclusion set forth in the official action, the Patent Office is obligated to address all of the evidence and base its forthcoming legal conclusion(s) on such evidence, uninfluenced by its earlier conclusions. *Rinehart*, 531 F.2d at 1052.

III. Miscellaneous Remarks

In accordance with 37 CFR § 1.104(c)(2), the Patent Office *must* designate as nearly as practicable the specific parts of each supporting reference applied to establish a finding of obviousness. Section 1.104(c)(2) also states that "[t]he pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified." It is respectfully submitted that the outstanding official action does not clearly explain the pertinence of each reference and the specific parts thereof applied to support the § 103(a) rejections. Indeed, the action hardly explains the pertinence of any of the references applied to support the obviousness rejections other than to direct the applicants to an isolated sentence or figure in each of the applied prior art references. Accordingly, it is respectfully submitted that this action, like the prior action, does not comply with § 1.104(c)(2) and, therefore, the action is incomplete under 37 CFR § 1.104(b). Nevertheless, the applicants are submitting the foregoing response in a good faith effort to advance prosecution of the application. Having

issued an incomplete (final) action, the applicants again respectfully request that the next action on the merits be made non-final.

CONCLUSION

In view of the foregoing, the applicants respectfully request cancellation of claims 42, 43, 46, and 47, entry of the amendments to claims 1, 5, 6, and 40, reconsideration and withdrawal of the rejections, and allowance of all of the pending claims.

Should the examiner wish to discuss the foregoing, or any matter of form or procedure in an effort to advance this application to allowance, the examiner is urged to contact the undersigned attorney.

Respectfully submitted,

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